DOCUMENT RESUME

ED 414 901 IR 018 693

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TITLE	Technological Challenges and Opportunities in the United States Education Information Network Collaboration and Service Delivery.
SPONS AGENCY	National Library of Education (ED/OERI), Washington, DC.
PUB DATE	1997-11-00
NOTE	30p.; Paper prepared for the USEIN Kick-Off Conference (Washington, DC, November 13-14, 1997). For conference proceedings, see IR 018 692.
PUB TYPE	Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	*Access to Information; Computer Security; Copyrights; *Educational Resources; *Electronic Libraries; Incentives; Information Dissemination; *Information Networks; Information Sources; Intellectual Property; Internet; Library Role; Library Services; *Partnerships in Education; Shared Resources and Services; *Users (Information)
IDENTIFIERS	Access to Computers; Education Libraries; National Library of Education DC; *United States Education Information Network

ABSTRACT

The definition, role, and functions of "library" are changing. The National Library of Education (NLE) is in transition from a traditional library to a virtual library encompassing "one stop [any stop] shopping" through conventional and digital means. To adequately plan for the transition, the customer and potential customers of NLE must be studied before technology based systems are installed. Challenges and technological changes of the transition will include: customer interfaces, organization and networking to facilitate access, amalgamation of existing components, recruiting external participants, maintaining quality services, and full text availability. An agenda for the technology-related aspects of the planning process includes: creation of a national union catalog of educational resources; development of metadata formats to serve as platforms for searchable databases; establishing methods and standards for operating multiple distributed collections as one; development of standards for delivery of full text and non-print materials; creation of a workable structure for digital copyright and protection of intellectual property rights; and development of safeguards for system security and individual privacy. Potential pitfalls in the planning process are delineated with suggestions for alleviating them. Topics include: quality of materials; scope and comprehensiveness of resources; copyright and other restrictions to the use of the materials; transition from current procedures to new protocols; cost to the users; the handling of multiple media formats; providing assistance to users; and internal agendas of participating organizations. (Contains 23 references.) (Author/SWC)

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ED 414 901

TECHNOLOGICAL CHALLENGES AND OPPORTUNITIES IN THE UNITED STATES EDUCATION INFORMATION NETWORK COLLABORATION AND SERVICE DELIVERY

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Prepared for the
United States Education Information Network Kick-Off Conference
Washington, DC, November 13-14, 1997

IR018693

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ABSTRACT

The definition, role and functions of "library" are changing. The National Library of Education (NLE) is in transition from a traditional library to a virtual library encompassing "one stop [any stop] shopping" through conventional and digital means. To adequately plan for the transition, a plea is made for studying the customer and potential customers of NLE before technology based systems are installed.

Assumptions are made about the nature of the planning process in regard to technology: ERIC exists and will form the core of the NLE; other library information services within the Department of Education should be linked to NLE through the U.S. Education Information Network (USEIN); implementation will occur in stages over several years; NLE will create knowledge products by analysis and synthesis of data and information; and NLE will provide filters to assist users in obtaining information efficiently as well as to receive it from them.

Beginning with the assumption that many components already exist in the scope of NLE/USEIN (e.g., INet, ERIC, Gateway to Educational Materials, NPIN and Virtual Reference Desk), a transition scenario spells out many of the challenges and technological changes that will have to be made. The challenges include: customer interfaces, organization and networking to facilitate access, amalgamation of existing components, recruiting external participants, maintaining quality services and full text availability.

An agenda for the technology-related aspects of the planning process includes: (1) creation of a national union catalog of educational resources; (2) development of metadata formats to serve as platforms for searchable databases; (3) establishing methods and standards for interoperating multiple distributed collections as one, even though in many locations; (4) development of standards for delivery of full text and non-print materials; (5) creation of a workable structure for digital copyright and protection of intellectual property rights; and (6) development of safeguards for system security and individual privacy.

Potential pitfalls in the planning process are delineated with suggestions for alleviating them. Topics include: quality of materials; scope and comprehensiveness of resources; copyright and other restrictions to the use of the materials; transition from current procedures to new protocols; costs to the users; the handling of multiple media formats; providing assistance to users and internal agendas of participating organizations.

Technological Challenges and Opportunities in
the United States Education Information Network
Collaboration and Service Delivery

What would you do if...

...a **high school mathematics teacher** asked for help in demonstrating an algebraic concept according to standards of the National Council of Teachers of Mathematics?

...a **school board member** wanted a copy of the sections of the Americans With Disabilities Act that pertain to educational facilities?

...an **elementary school student** wanted to connect with students in a European country who could work cooperatively collecting environmental data?

...a **school system superintendent** wanted statistics on high school dropout rates for the past 3 years so that she could compare local rates with national figures?

...a **Ministry of Education official** from Peru wanted a schematic diagram of the structure of the American education system?

...a **parent** wanted information that would help his 9 year old son to use the computer in creative ways to enhance his school work?

...a **social studies curriculum specialist** wanted an audio recording of the "I Have a Dream" speech of Martin Luther King, Jr.?

...a **school library media specialist** needed a list of all the Newbery Award books since the award was begun?

...a **Department of Education** staff member needed information about the Department's data collecting policies fifty years ago.

...an **education editor** from a major teacher organization needed pictures of high school students participating in science projects?

...a **teacher educator** wanted the source of video vignettes showing student teachers working with small discussion groups in secondary school settings?

Many more questions could be added to this list. The basic question is: "Where does each person go to obtain the needed information? As one reviews the list, it is obvious that there are several sources. A general rule is that the information seeker usually uses the "path of least resistance." If a teacher across the hall can suggest demonstration techniques that would help the mathematics teacher, the colleague would be a primary source. If the mathematics teacher knows about the Eisenhower National Clearinghouse for Mathematics and Science Education, that could be another source. If the teacher does not know where to turn, the National Library of Education might be the place to contact.

Library services for educators already exist. They do not have to be created. Within the existing National Library of Education there are four clusters of library service--many of them "virtual"--1-800 User Service, INet, ERIC and a library resources network. What seems to be required is a plan for amalgamation, collaboration and access that will lead to a comprehensive and seamless virtual library. The report of the National Library of Education (NLE) Advisory Task Force (Access for All, 1997) provides a helpful outline to explore the current and future role of technology in delivering library services primarily through electronic means.

Definition of Library

Library is a function (not a place) whose responsibility is to systematically collect information, classify it, store it and, upon demand, retrieve it and assist in adapting it to the user's requirements. For the National Library of Education, this definition is extended to include the analysis and synthesis of data and information to create knowledge products and to serve as a user-oriented "intelligence agent."

Much has been written about the virtual library. One of the most insightful books is *The Evolving Virtual Library: Visions and Case Studies* (Saunders, 1996). In an overview chapter written with Maurice Mitchell, Saunders explains that "The virtual library ...[is]... a metaphor for the networked library, consisting of both local and remote resources, in print, electronic, and multimedia formats." This chapter also includes a comprehesive definition:

> The virtual library has been defined as the concept of remote access to the contents and services of libraries and other information resources, combining an on-site collection of current and heavily used materials in both print and electronic form, with an electronic network which provides access to, and delivery from, external worldwide library and commercial information and knowledge sources. In essence, the user is provided the effect of a library which is a synergy created by bringing together technologically the resources of many, many libraries and information services (Galpen, 1993, p. 1).

Functions of a Contemporary Library

It has been suggested that the term, "library" is out-of-date in an information society. Rather than to get into a semantic skirmish, consider the functions of a library or information service in today's world. While the image of a "patron" approaching a genial person called "librarian" in a book-filled building should not be completely lost, the contemporary function of this interaction can be described in electronic terms. The "information specialist" is a professional who has been educated and trained to help individuals meet their information needs.

Sutton (1996) has created a four part typology of libraries that reflects the changes from today's libraries to the digital libraries of tomorrow.

* Traditional: "...a specific place with a finite collection of tangible information bearing primary entities like books and journals...."

* Automated: a mix of paper and digital reference resources and meta-information that "point to non-digital media"

* Hybrid: typified by the use of both print and digital meta-information sources (increasingly digital) and the coexistence of both digital and paper primary resources. This type of library allows for remote access to "some subset of the library's digital collection or to digital resources."

* Digital: "...the library as a logical entity. It is the library without walls--the library does not collect tangible information bearing entities but instead provides mediated, geographically, unconstrained access to distributed, networked digital information (Sutton 1966, pp. 131-138).

Figure 1 displays the continuum described by Sutton (1996).

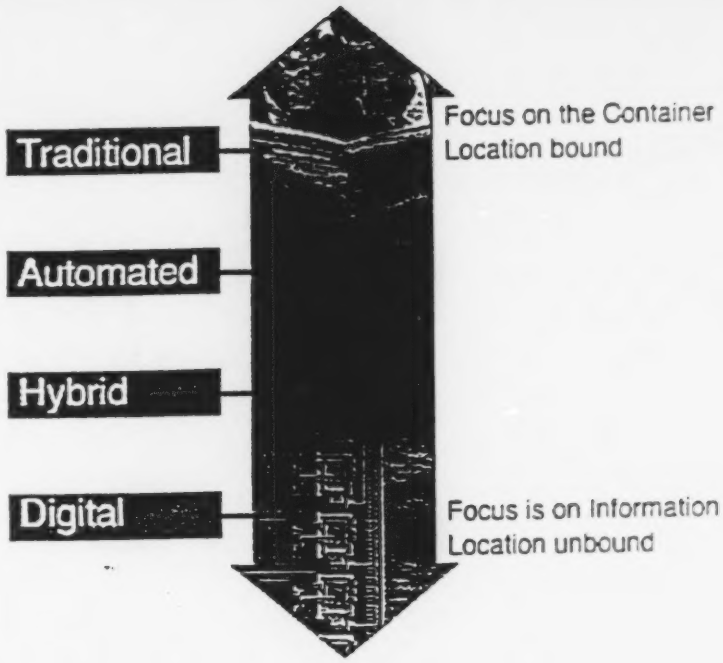

Figure 1 Continuum of Libraries: Sutton (1996) establishes a continuum of libraries from "traditional" that is bound by its physical facilities and concentrates on "objects" such as books to "digital" in which the network and electronic documents make objects and location irrelevant.

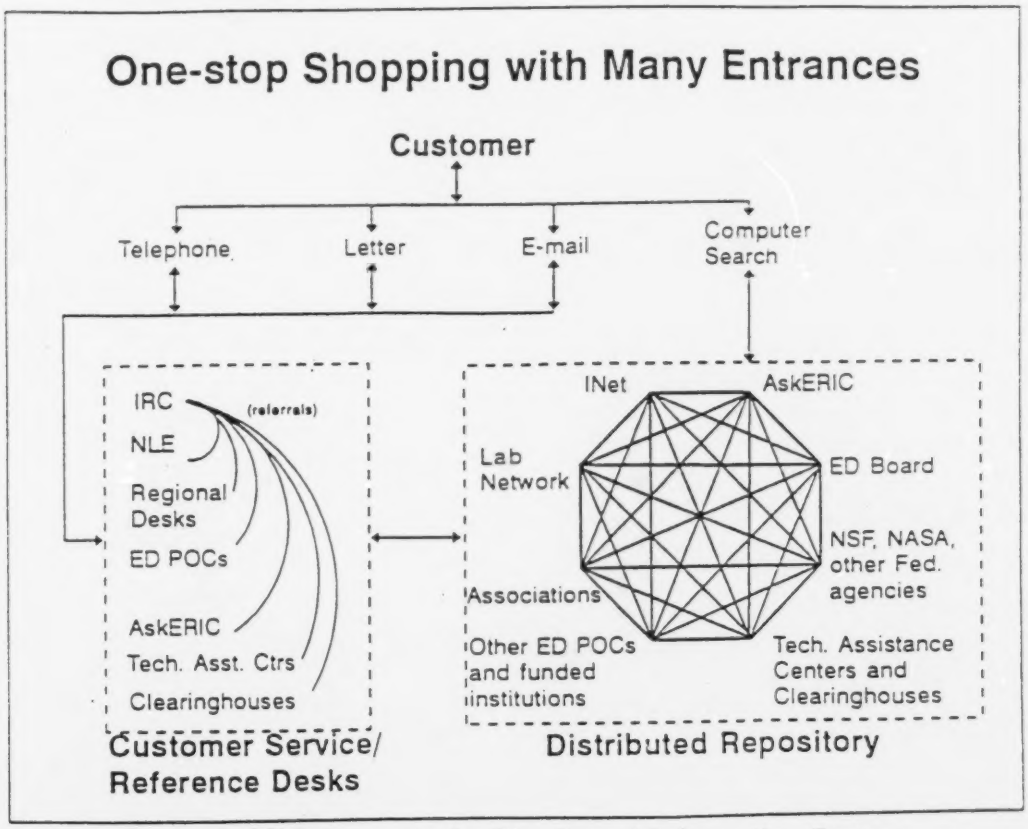

Figure 2 NLE Concept of a Distributed Information System

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In each type of library, the traditional functions of selection, cataloging, retrieving, and distributing information remain. The information delivery medium is often print but includes visual materials, audio materials, maps, objects, and a wealth of other media, increasingly in digital formats such as CD-ROMs, laser discs, computer tapes, and yet-to-be-discovered vehicles. These storage vehicles are as inert as books on a shelf until someone uses them. The computer is the most frequently mentioned digital device that stores, processes, shapes, selects, transmits and even interprets information. It often reconfigures media thus blurring the traditional boundaries between them. The ubiquitous nature of the computer means that it serves as a conveyer, classifier, translator and processor but it is not a medium in itself; it is an information storage, retrieval and delivery system. The focus for information specialists is on what is put into the system and how to apply the output to the needs of users.

A more contemporary function of information systems is the potential to accept new information from users and to help mediate users' needs for knowledge by a systematic application of information filters that lead to knowledge products. In education, "products" are created that eventually can be part of existing information systems. For example, a graduate student contributes a copy of his/her or disseratation to a library and/or a national repositiory of doctoral dissertations. In many schools and colleges, students
produce video reports and audio tapes of local historical interest. Teachers create new computer-based instructional programs and lesson plans that are useful in other than local settings. Television networks maintain archives of news and other significant events that are available for use in education settings.

The communication capability of computers, when connected to the Internet and other networks, permit collection of commentaries and critiques of teaching and learning materials. Teachers can comment on the utility of lesson plans available from the Eisenhower National Clearinghouse. Discussion groups involving educators using e-mail cover a host of topics that are often archived and

available for later use. The ubiquitous World Wide Web contains still more information and new sites are appearing at the rate of several thousand a day. Of course, all of this is adding to the deluge of information considered by some to be overwhelming. One problem is the quality of the material stored in such systems. Another problem is the organization of all the information so that is can be accessed when needed. A wealth of information is not always an asset. NLE will have to deal with this reality.

Data, Information and Knowledge

Much has been made of the distinctions between "data," "information" and "knowledge." Raw *data* are pieces of fact--numbers, statements, listings, etc.-- that are generally unorganized and open to interpretation. *Information* is an organized collection of data deliberately designed for use. Information is that which is needed for specific purposes at a specific times; it can be discarded after use like a paper towel. *Knowledge* does not come into existence until someone assimilates and processes information and fact. Knowledge presupposes an active approach, characterized by analysis. Knowledge is something that is usually retained, augmented and relished over the years.

A delightful essay, "In the Praise of Knowledge" published by the Royal Bank of Canada (1997), states that "Knowledge is the one precious commodity that can be given away without a loss." Further, in a commentary on the current obsession with a single source of knowledge, the author of the essay says that "People who 'surf the Net' pick up a great deal of general knowledge on their cybernetic rambles, while other Net users are likely to absorb a broad range of facts in searching for information in data bases and web sites. Those who use electronic mail to chat with one another are essentially exchanging knowledge, however casually." (Underlining added.)

In planning for technology in the National Library of Education, the words of James Billington, Librarian of Congress, should be noted:

> The flood of unsorted, unverified information will not replace knowledge if we librarians succeed in making our own transition from

> simply being information dispensers to becoming sophisticated knowledge navigators....the need for a special cast of discriminating knowledge navigators who will add value of judgment and the warmth of human mediation to all this unintelligible material.
>
> There will need to be human mediation in a shared communal setting, where electronically dispensed information is linked with a storehouse of human memory, with human judgment, and with the miscellaneous humanity of the community itself. The role of libraries as well as librarians becomes more, not less, important. (Billington, 1996)

These words could well become a guiding principle for the National Library of Education. This vision points toward the creation of a library for the 21st Century--a **virtual library**.

The Concept of a Virtual Library

The report of an ERIC Real and Virtual Libraries Task Force (1996) brings the concept into focus.

> The National Library of Education is both a real and a virtual library. It has its own facility and collection; provides reference service and technical assistance; and has links with other information service providers. The chief potential of the NLE will be as a virtual library, a function, rather than a location. The NLE will be a source of information accessible to anyone anywhere at any time or place. Information (in any medium) will be organized systematically and made available for use by any person who has legitimate access to it *wherever they may be.*

This vision of NLE can be implemented by linking existing services within NLE and the U.S. Department of Education with those of potential external partners while, at the same time, developing a communication network among all components.

Five current projects sponsored by the NLE offer models for further development as components within a virtual library: INet, AskERIC, the Gateway to Educational Materials (GEM), the National Parents Information Network (NPIN) and the Virtual Reference Desk (VRD).

INet, the public access Internet service of the U.S. Department of Education, is

an active, functioning entity. It provides general information about the Department and its special programs such as Goals 2000, School to Work and standards projects. New information, press releases, new publications, calandars, and directories of exemplary schools add to the resources as do pointers to other education-related Internet sources.

AskERIC is five years old. In that time, it has answered over 100,000 questions via the Internet. AskERIC has developed a "digital triage" system based on help-desk software. The software helps AskERIC Network Information Specialists to locate and retrieve resources that have been archived for future reference. Every inquiry is answered within 48 hours, often less. AskERIC has received several awards for its creative and responsive service to customers. On the World Wide Web homepage, customers can locate the Virtual Library that offers the ERIC database, an ever-expanding collection of high quality lesson plans and connections to other Web sites.

The **Gateway to Educational Materials (GEM)** has become a "one stop, any stop" access point to thousands of lesson plans, curriculum units, and other educational materials that exist on Web sites across the Internet. GEM is creating a standard description of the materials and will assemble these descriptions in a single union catalog, creating easy access no matter where the materials reside on the Internet. This effort is a direct response to needs expressed by the NLE Advisory Task Force and a commitment by President Clinton to provide quality information to the education community.

The **National Parents Information Network (NPIN)** finds and shares high quality materials related to parenting and parent involvement in education. The focus is on creating an attractive, widely available resource collection that incorporates graphics and other parent-friendly features of the Internet. NPIN provides a single point of access on the World Wide Web to noncommercial information on parent involvement in their children's education.

The **Virtual Reference Desk** is currently studying how students, educators,

and parents use the Internet to receive answers to their questions and how AskA services provide some of those answers. (AskA services are those Internet sites that provide direct responses to information seekers, for example, the Internet Public Library and the MAD Scientist Network.) Experts from schools, colleges, industry, and government are cooperating with the Virtual Reference Desk project to build a network of expertise, experience, and unlimited possibilities for learning.

Each of these projects offer an emerging prototype for expanded services within the National Library of Education. They offer the advantage of broad participation by both those who provide information and those who seek it. They demonstrate specific actions taken in response to the NLE Advisory Task Force.

The Customers of NLE: Who are they? Where are they?

The NLE is a prime source of information for professional staff of the U.S. Department of Education and its Regional Office staff. For others, it is more a "switchboard" where "customers" make contact at one point and responses come from a variety of remote locations. Its resources are classified and stored in many locations throughout the country and even other parts of the World. The major purpose of NLE is to be certain that individuals who seek information about any facet of education are satisfied with the responses they receive. The concept is very much like airline reservations offices. They are located in several regions of the country and when one calls (or contacts a computer) for reservations, the inquiry is shunted to the nearest available agent (or computer) and the booking is made directly.

Customers of the NLE should have one point of contact where questions and/or requests can be initiated. Individuals who seek information, like streams of water and electricity, seek the path of least resistance. That is why a person may ask someone in the office next door for a specific piece of information rather than go to a nearby library. Designers of the NLE should recognize the reality of this phenomenon. The starting point is one contact, be it a postal address, an 800/888 toll free telephone number, an e-mail or World Wide Web address, a FAX number or a

face-to-face encounter in a place called library or information center. That point of contact becomes the switchboard as soon as a request for information is made. Information may be directly available from the initial contact point or it may be necessary to transfer the request to another source seamlessly (which means that the customer does not necessarily know where the request has been referred to or who is working on it). This is definitely not the place where a customer is told to go to another source or two where the information may be found.

This focus on one point of contact underscores the centrality of the customer before any thought of technology is introduced. Before a comprehensive information system is designed for NLE, it would be wise to review who the customers and potential customers are and what is already known about their information seeking behavior. Too many systems have been created by information technologists only to discover that the users found them irrelevant, confusing and misleading. NLE needs to know:

* Who are the customers?
* What type of information they seek?
* Where they normally go to obtain needed information?
* What frustrations they encounter when seeking information?
* How satisfied they are with the responses they receive from current sources?
* To what extent electronic access is available to users and potential users?
* What they would consider to be an ideal information source?

Answers to some of the above questions are already available (Heaviside, et.al. ,1997; USA Today Poll, 1997; McDonald, et.al., 1981). These questions must be addressed and further studies conducted to update the status of users and their information needs.

Making it Work for Customers

In the information age, it is appropriate to consider the role of technology in the implementation of NLE. **Computers plus communication channels** are basic to

the NLE virtual library. Sixty-five percent (65%) of teachers, computer coordinators, and librarians say that students typically use the Internet in the library while supervised by a librarian. A current National Center for Education Statistics (NCES) study reports that 61% of all public elementary schools and 77% of secondary schools have Internet access (Heaviside, et. al., 1997). It is likely that this number will increase significantly in both library and home environments. However, it is not sufficient to meet the *Access for All* vision that "...all persons have equal access to the information necessary to their personal and professional growth." Therefore, alternative means must be put in place to meet this goal.
John D'Amicantonio (1997) outlines some of the mechanisms that can help to achieve "equal access to all."

The computer is the core of NLE's technology but it must be put into perspective. David Lankes, Associate Director of the ERIC Clearinghouse on Information & Technology, provides a useful perspective:

> The irony is that as computers have come into libraries we have realized their potential in improving human-to-human communications. E-mail, Lotus notes, online chats, listservs, bulletin boards are all being used in our libraries to allow people:
>
> * Better communication;
> * Flattening the hierarchies, in essence allowing better access to expertise at all levels; and
> * To easily capture organization knowledge and memories in the form of minutes and discussion archives.
>
> We see the value of using computers to improve access to knowledge and expertise. Yet we turn around and provide our patrons with online card catalogs and Internet access. Why do we understand the value of communication within our organization, and yet fear offering that very value to all our patrons? (Lankes, 1997)

Computers can help by creating filters that hold personal profiles regarding information and knowledge preferences of individuals. These filters serve as user-driven intelligence agents. This proactive stance is exemplified in each stage of Sutton's continuum beginning with traditional and moving to automated then to hybrid, and finally to digital libraries (Sutton, 1996).

Technical limitations and sometimes personal preferences may cause some individuals to seek alternate points of entry to the United States Education Information Network. **Face-to-face** meetings between users and information specialists has been the traditional access since libraries were founded. The person at the "reference desk" has always been an important contact for individuals seeking information. A physical setting, more like a traditional library, will exist in Washington, DC and will serve those who come directly to it. Many of these users will be employees of the Department of Education. This collection serves a relatively few people when compared with all the users from across the country who will use the USEIN .

A contemporary version of the person-to-person interaction is the **telephone reference service** that offers question answering quickly and permits the information specialist to pinpoint the information being sought. The telephone is a viable alternative and is a communication device more widely available than computers in schools. With 800 and 888 toll-free access, contact with an information specialist is easier and cheaper. The current 1-800 User Service should continue to be available for those who prefer to speak with an information specialist. All ERIC Clearinghouses have toll-free telephones as well.

Using telephone lines, the **FAX** (facsimile) **machine** can have an assigned toll-free number as well. An additional advantage of this medium is that it can be used at any time from a FAX machine in any location. There is a paper copy of the response for easy use by the customer and the cost is relatively low.

The **U.S. Postal Service** and private delivery services offer an alternative. In these days of "instant information" they usually become a last resort. Requests for specific publications and other less urgent information can use these services. They are elements of a total communication system.

These existing delivery systems, designated "traditional," will continue to be used by the NLE. At the same time, new technologies and networks will open up the availability of resources now limited to only local users. The key to success will

be the extent to which the best of the traditional is blended with the new technologies that are introduced over time. These stages are identified as "automated" and later, "hybrid."

The process will take some time. A five year study on providing online access to scholarly journals indicates that the transition from conventional to digital libraries will take much longer and cost more than commonly thought. The University Licensing Program (Project TULIP) final report (Hunter, 1996) emphasizes the importance of knowing what library users want and the need to promote awareness of electronic access among the faculty. Further, faster speeds and increased storage capacity on campus networks was deemed essential before further development takes place. It appears that the "hybrid" library will lead the march to the 21st Century.

The Transition

In his book, *The Gutenberg Elegies: The Fate of Reading in an Electronic Age,* Sven Birkerts charts a course that could be embraced by NLE.

> We have, perhaps without noticing, slipped over a crucial threshold. We have rather abruptly replaced our time-honored and slow-to-evolve modes of communication and interaction with new modes. We have in significant ways surmounted the constraints imposed by nature, in the process of altering our relation to time, space and to each other.
>
> For, by moving from the order of print to the electronic, we risk the loss of the sense of obstacle as well as the feel of the particulars that have characterized our experience over millennia. We are poised at the brink of what may prove to be a kind of species mutation. We had better consider carefully what this means (Birkerts, 1994, p. 31).

A careful consideration of the meaning of these new modes of communication and interaction from the perspective of the library/information community has been spelled out by Peter Young, Executive Director of the National Conference on Library and Information Science. He indicates the following trends and shifts:

From	To
Fixed permanent text collections	Fluid, transient multimedia

	resources
Acquisition of formal publications	Integration: informal, formal services
Static library facilities w/fixed stacks	Free/flexible/virtual information spaces
Uniform sources, citations, references	Customized annotation transient works
Services provided to individuals	Services tailored to collaborative teams
Standard reference services	Personalized consulting and analysis
Professionally provided services	Integrated service provision
Locally owned permanent collections	Wholistic networked systems
Centralized collections and services	Distributed, decentralized global access
Hierarchical organizational structures	Participative, collegial relationships
Discipline specialization	Inter/multi/cross-disciplinary studies
Generic user service offerings	User/use specific relevant services
Subscription-based services	Pay-per-use services (Young, 1995)

Note the terms: "customize," "collaborate," "participate," and "decentralize." These concepts will become part and parcel of the NLE. No longer is "library" only a storage and delivery operation; in its virtual incarnation it will be a service that values interaction; a place where people can seek other people with mutual interests and an institution that welcomes substantive contributions to its intellectual and informational "collections." Early signs of contributions can be seen in the construction and availability of World Wide Web sites created by individuals who want to communicate with others to share ideas, information and intelligence. Now mostly in text and graphic formats, the new "publications" in the virtual library eventually will be in multiple media formats and will be accessible to all.

It is with these trends and changes in mind that the following plan is offered as a first step in planning and implementation. We begin with several important assumptions and then the challenges that face the planners.

Assumptions

The National Library of Education is already in place. The assumptions which follow are points of departure for technology planning.

1. The existence of ERIC provides a foundation for NLE to build upon. ERIC is a solid core around which other elements of the system can

be designed.

2. There are other information resources within the Department of Education (and funded by the Department) that should be linked to the NLE, e.g., the Regional Educational Laboratories Network, the National Educational R & D Centers, the Eisenhower Clearinghouse for Mathematics and Science Education.
3. The NLE development process will occur in several stages over several years. Those stages should be described in the planning process.
4. A "virtual library" requires cooperation of institutions and organizations external to the Department of Education. Some incentives for participation will have to be developed (Carr, 1997. pp. 12-15.)
5. The NLE is charged to serve internal (ED) customers as well as external customers.
6. The role of the NLE goes beyond merely providing data and information; it provides knowledge through analysis, synthesis and interpretation of education data and information.
8. Access to information and knowledge in print and non-print formats will be available.
9. NLE will be in a position to receive as well as to deliver information.

Challenges to The National Library of Education

The National Library of Education (NLE) already exists. From its present elements, a systemic information network will emerge not unlike the National Libraries of Agriculture and Medicine. But the USEIN will be a distributed information network rather than a highly centralized entity. Agriculture and Medicine began as centralized libraries; USEIN will begin as a distributed library. This is unique among national libraries and therefore has to be planned accordingly.

Figure 2, a graphic representation of a distributed system prepared by NLE, provides a visual image of the USEIN. It depicts the three essential components of the system: the **customer**, the **access points**, and the **repositories** of data, information and knowledge. The **first challenge** is the customer interface.

The **customer** (user) is usually an individual who wants or needs data, information or knowledge that is not generally available at the local workplace. The type of user varies widely and so do the questions raised. Most inquiries are likely to come from teachers and students at all levels of education--pre-school to graduate school. Other users come from education environments such as: administrators, subject (curriculum) supervisors, librarians, teacher educators, counsellors, and other specialists. Also closely related to the schools are school board members, parents, news reporters, and interested citizens.

The customer can reach the **access points** through mail, telephone, FAX, e-mail or, in a few cases, face-to-face meetings. In some cases the user will interact with an individual who is responsible for responding. An increasingly preferable approach is directly through an electronic network, probably the Internet, to search data bases, World Wide Web sites, and online digital libraries. In some cases the availability of appropriate CD-ROMs at the user's location would provide still another direct approach. Delivery is usually made in print (on paper or computer screen) or in the medium on which the information is stored.

The **second challenge** is organization and networking to all appropriate **repositories**, so that **access** by **customers** is made quickly and easily. To the customer, this contact is seamless and timely. The immediate challenge, beyond the initial organization phase, is to alert and sensitize all elements of the network to the operating procedures that will insure customer satisfaction.

Repositories are the locations (physical and virtual) where data, information and knowledge are stored. At each location the data, information and knowledge is available through various computer storage media (tape, disc, etc.), microforms, printed books, monographs, journals, brochures and non-print media (videotape,

film, photographs, audiotape, laser discs, digital disks, etc.). The physical storage locations are located at such places as universities, education associations, state departments of education, libraries (traditional and digital), teacher union offices, commercial information services, and the National Library of Education's Washington location. These repositories should be active partners in the USEIN.

At this point, the collection becomes so large that customers no longer want all the information available on a given topic, but the "best" information. The librarian's role shifts from custodian of the collection to a filter for the user. Since the user is no longer bound by geography (or technology) the user will select services based on how well they create a context useful to that person. This approach begins to describe the "digital" library that emerges from a "hybrid" library.

The **third challenge** begins with the "given" that NLE will be a "virtual library." It would seem appropriate to begin with with those elements that are already operating in this vein. The NLE Advisory Task Force (1997) has already spelled out the components of the USEIN (p. 5). There appears to be four groups of network participants: (1) those services already functioning within the programs and scope of the National Library of Education (e.g., ERIC, INet, 1-800 User Services, etc.); (2) those operating under contract with other U.S. Department of Education offices (e.g., Eisenhower National Clearinghouse, Regional Educational and R & D Centers, etc.); (3) other Federal programs and services related to Education (e.g., the National Science Foundation's Digital Library project; the Library of Congress' American Memory project, etc.); and (4) public and private programs and projects at the national, state, and local level that fall within the scope of the NLE (e.g., Ohio's SchoolNet Software Review Project; American Association of School Librarian's KidsConnect project; etc.). Many of these programs and projects are focused on digital information systems.

Additional links to the major Education collections in large universities such as Harvard, Stanford, University of California at Los Angeles and Teachers College, Columbia University will be active partners in providing comprehensive coverage

of archival and other published literature. The university collections are largely print-based and represent much of the archival material in Education. Initially, books from these collections will be the deliverable product. The process will probably be a variation of the public and academic library interlibrary loan (ILL) program, with some adaptation for shorter-than-book length requests.

The **fourth challenge** is to "recruit" potential participants to the USEIN. For those currently in the NLE scope, there should be minimal difficulty; for those within the U.S. Department of Education sphere, "creative coercion" may be necessary to encourage active participation; other Federal agencies, would have to see synergistic benefits that would enhance the image of each agency--rewards for participation that exceed those of their independent operations; and for those outside government, there would have to be tangible benefits for participation. Carr (1997, pp. 12-15) suggests what some of the incentives could be.

Most organizations and government agencies want to project a forward-looking image that is on the cutting edge of developments in the fields they represent. Participation in the first national virtual library might offer such an inducement.

In a move related more toward organization than to technology, partnerships will be arranged with education-related organizations, agencies, and services. It is assumed that all parts of the USEIN will be connected by communication networks that are already in place (or can be put in place) and that interactions will be possible through compatible systems. A comprehensive list of potential partners is described by Libutti (1997, pp7-11;
14-16) in a paper prepared for the USEIN Kick-Off conference. Carr (1997,
pp. 2-12) also details profiles of potential partners in a paper presented to the same conference.

Quality Concerns in Distributed Information Networks

The proliferation of information sources and the growing tangle of new sources has given rise to a **fifth challenge: quality** of the information and knowledge that is available through the USEIN. In a report of a symposium at the 1997 American Library Association (ALA) conference (http://rs.internic.net/nic-support/nicnews/aug97/enduser.html), Jack Soloch summarizes the perceptions of Internet use through the comments of participants. James Rettig of William & Mary University said that "...quality signposts, as well as resource organization, are absolutely necessary in order to be able to help patrons find the best Internet resources available....Internet resources [are] much less trustworthy as reliable sources of knowledge and information." Sam Demas of the Cornell University discussed the efforts of his library to collect, organize and disseminate Internet resources via a web catalog (http://www.mannlib.cornell.edu/catalog/). He stressed the importance of web selectors having the same formidable subject skills of book selectors. Both speakers felt that libraries have a large role to play as gateways to networked information by bringing their considerable skills to bear on the problem.

Selection is usually done with quality in mind. In these days of explosive website development, the concept of a quality filter has to be advanced. The ERIC system has been an arbitor of quality for over thirty years each time a document or journal article has been reviewed for placement in the database. The distributed nature of ERIC Clearinghouses, each with its specific content scope, has provided a value added dimension to the items selected. The sixteen clearinghouses do not provide 100% of subject matter coverage. There are gaps which have to be filled as USEIN recruits its partners. The concept of quality must be evident to both information specialists and users.

NLE's Gateway to Educational Materials (GEM) project is currently reviewing materials listed in its database according to a set of validated criteria. A review of this effort should help to facilitate the selection process using quality criteria. It

could serve as a prototype for other quality-oriented procedures.

Individuals are stepping up to address the quality question. At the University of Evansville, a philosophy professor has taken matters into his own hands and created a search engine for his area of expertise, the ancient world (http://argos.evansville, edu/). His engine, called Argos, filters out unwanted information by limiting searches to preselected web sites deemed to be scholarly and topical by a group of of editors. The professor said: "We're imagining a whole series of these search engines to serve academe." (Chronicle of Higher Education, Oct. 18, 1996).

A **sixth challenge** involves one of the continuing barriers for many information seekers: obtaining a full text document once an item has been identified by title and/or abstract. For ERIC, the full text document is available on microfiche and paper copy. There is currently an experimental project to store and retrieve documents in digital formats (ERIC Annual Report, 1997, p13; 23). If full text information were available in digital format, it could be sent via the Internet to customers who request it. Better still, once a user wants a document after reviewing an abstract on a computer screen, it could be ordered and sent with one key stroke. Such developments are still in their infancy but with the vision of meeting user needs as efficiently and economically as possible, continuing efforts should be made to study and pilot test new technologies.

Digitization would also make documents available on laser discs. Just as the entire ERIC database has become available on CD-ROM for about $100, so should documents within the database be available on laser discs (or their next iteration) that permits large scale storage of print and graphics. Frustrations about obtaining full text of journal articles continues. There are technologies today that can provide such services but, for many users, the price is still exorbitant.

A Technology Planning Agenda

A planning agenda that would enhance the individual organization while benefitting the network would be an attraction to potential partners. By participating in the detailed planning of the USEIN, each organization would derive potential benefits for its customers as well as kudos for contributing to the larger effort. They would not lose their identity and would continue to serve their constituency at an enhanced level. The following agenda could also be an inducement for potential partners. It is built on suggestions of Roy Tennant (1996) and the ERIC Operations Framework Task Force (1997).

1. Creation of a "national union catalog" of educational resources ("the main venue for organizing, linking, describing, and making accessible *all* key education resources in *all* formats" as specified in the report of the ERIC Operations Framework Task Force (1997). Such a "catalog" would adhere to the use of Z39.50 gateways.
2. The development of metadata formats to serve as platforms for searchable databases (data about data, such as bibliographic citations for digital documents). OCLC's FirstSearch offers a model for this type of operation as does NLE's GEM (Gateway to Educational Materials). Using a somewhat different approach, EDUCOM is developing metadata specifications for materials used in higher education thus making them easier to find on the web. The specifications use a common vocabulary for searching and using the various components that make up educational software. EDUCOM is also making available Java-based tools that will assist content developers in applying metadata labels to their materials. This type of assistance is one step toward helping the user to locate needed information in a user-friendly manner.
3. Establishing methods and standards for interoperating multiple distributed collections as one (making a digital library work as one collection when it encompasses a number of physically different

locations); "any stop shopping" would mean that the customer is no longer bound by geography or technology.

4. The development of standards for delivery of non-print materials: films, videos, photos, graphics, maps, audio, and other audiovisual media. and other services requiring authentication (e.g., ILL, document delivery, customized interfaces).
5. Creation of a workable structure for digital copyright and protection of intellectual property rights.
6. Development of safeguards for system security and individual privacy.

Potential Pitfalls

A summary of the potential pitfalls stem from some of the challenges already discussed and should be considered for the agenda of NLE/USEIN planners. The negative tone of "pitfalls" could be reinterpreted as warnings to planners as they consider implementation of the recommended strategies.

1. **Quality.** Information available through the NLE must meet high quality standards. Irrelevant materials, poorly presented and lacking integrity would give a negative impressions to users.
2. **Comprehensiveness.** The boundries of Education shift. Clarity of scope and content facilitate satisfaction of users. Guidelines for inclusion/exclusion of information must be developed. For example, emphasis on preschool-grade 12 tends to diminish the importance of postsecondary education.
3. **Public Domain.** Most of the information provided to users should be free of restriction, such as copyright. Procedures for using copyrighted material must be clear. Procedures for acceptance of substantive subject matter must be spelled out. (Perhaps the ERIC disclaimer form would be acceptable for all NLE materials.) This issue will become increasingly important as individuals add new materials to databases.

4. **Transition**. Customers cannot wait until the entire system is in place. Encouraging users to move from current practices to new (and presumably better) protocols will require some "hand-holding." This is the "assistance" perspective in the NLE Task Force report. Lack of assistance will discourage users. Protocols for assistance must be established early on with evolving changes of the system in mind.

4. **Cost.** Individuals related to the Education enterprise have limited financial resources. While "free" information for all is an ideal that and should be maintained, there will always be some expense in the process of information transfer. Local access via computers and telecommunications, telephone line charges, copies of materials, and local support personnal salaries are a few of the additional costs to institutions that are usually hard-pressed for finances. To create a system that requires a substantial outlay of funds for its local use will discourage potential customers.

6. **Multiple Media**. Information is traditionally considered to be in text format. However, there are increasing amounts of information stored in nonprint media. These formats are usually more difficult and expensive to obtain. Newer digital technologies are facilitating access but development is still underway. System planning should include all media formats even though some will not be available immediately.

7. **Assistance.** Despite the impressive statistics about the number of computers in homes and schools and the rapid growth of the Internet, there are many more individuals related to Education who do <u>not</u> have the knowledge and skills necessary to use new technologies for teaching and learning in optimum ways. A recent study at Seton Hall University reports results that are

typical for many higher education institutions. A majority of respondants cited "providing adequate user support" as their Number 1 concern (Chronicle of Higher Education, Sept. 5, 1997). Assistance can be one-on-one locally or remote using Internet-based instruction.

8. **Internal Agendas.** The ever-present threat of duplicating efforts and protecting existing territories are common blights of many governement agencies. Education is no exception. If the USEIN is to work and become a preeminent national education network to the nation, it cannot afford the political sparring that often accompanies the establishment of a new entity. Participation in the planning process can be one preventative of potential conflicts. Such matters are often delicate but must be faced openly and with the good of the order paramount.

Users--Again!

Return to the users. Most customers of information services want specific responses in a *timely* fashion. They want *quality* information, usually in *full text* formats with supporting graphics and they want it *now*. Ideally, the NLE/USEIN will eventually meet these specifications. This vision should not be lost. It will take time and new technologies to make this image become a reality.

Returning the the Report of the NLE Advisory Task Force, it seems that **Awareness** is a marketing and outreach endeavor that can be marshalled and implemented with short and long range plans; **Access** is almost universally available whether by computers, networks or by more traditional means. In some sense, the technology that provides access is the easiest of the concepts to implement. However, **Assistance** is often unknown and perhaps the most difficult concept to deliver. Most of the literature about teacher use of computers and networking indicates that lack of skills and confidence in using technology are major barriers to use. Whether it is initial reluctance to begin training, lack of

opportunities for training and follow-up practice, availability of help within the local setting, or a fundamental negative attitude, this important aspect of the NLE mission cannot be delayed or neglected.

The final "A" in the awareness, access, assistance alliteration is *accountability*. It is the user to whom NLE is ultimately accountable. It is the user who should be the focus of the planning effort; it is the user who should be considered when deciding upon technological delivery systems; and it is the user who is then accountable to professional education colleagues, the public, parents and student--the final accountants of this "new national library for tomorrow's learners."

The author would like to acknowledge the substantive contributions and suggestions of Michael Eisenberg and David Lankes.

REFERENCES

Access for all: A new national library for tomorrow's learners (1997) Washington, DC: United States Department of Education.

Billington, J. (1996) A technological flood requires human navigators. *American Libraries*, June/July

Birkerts, S. (1994) *The Gutenberg elegies: The fate of reading in an electronic age.* Boston: Faber and Faber

Carr, Jo Ann (1997) Roles, Responsibilities and Incentives for Potential USEIN Partners. Paper presented at the U.S. Education Information Network Kick-Off Conference, Washington, DC, November 13-14, 1997.

Chronicle of Higher Education (1996) October 18, p. A23.

Chronicle of Higher Education (1997) September 5, p.A24.

D'Amicantonio, J. (1997) Access and Equity Issues in Providing Effective Educational Information Services Through the USEIN. Paper presented at the U.S. Education Information Network Kick-Off Conference, Washington, DC, November 13-14, 1997.

ERIC Annual Report 1997 (1997) Washington, DC: Educational Resources Information Center, National Library of Education, Office of Educational Research and Improvement, U.S. Department of Education.

Galpen, D.K. (1993) The virtual library: knowledge, society and the librarian. in L.M. Saunders (ed.) *The Virtual Library: Visions and Realities.* Westport, CN: Meckler.

Heaviside, S., Riggins, T. and Farris, E. (1997) *The survey of advanced telecommunications in U.S. public elementary and secondary schools, Fall, 1996.* Washington, DC: U.S. Department of Education.

Hunter, K. (ed.) (1996)*TULIP final report.* New York: Elsevier.

Lankes, D. (1997) Personal communication.

Libutti, P. (1997) Model Organizational Structures and Best Practices for Successful National Collaborative Information Partnerships. Paper presented at the U.S. Education Information Network Kick-Off Conference, Washington, DC, November 13-14, 1997.

McDonald, D., King, D., King, S.,Levitz, A., O'Brien, K., Roderer, N. and Schell, C. (1981) *Cost and usage study of the Educational Resources Information Center (ERIC) System* (Final Report) Rockville, MD: King Research, Inc.

Real & Virtual Libraries Task Force (n.d.) Washington, DC, duplicated report to the ERIC Directors, June, 1996.

Rising expectations: A framework for ERIC's future in the national library of education (1997) Report of the ERIC Operations Framework Task Force.

Royal Bank of Canada (1997) *In praise of knowledge.* Montreal: Royal Bank of Canada

Saunders, L.M. (ed.) (1996) *The evolving virtual library: visions and case studies.* Medford, NJ: Information Today, Inc.

Stoloch, J. (1997) Librarians--gatekeepers of the information age, or the new Luddites: views from the 116th ALA conference. <http://rs.internic.net/nic-support/nicnews/aug97/enduser.html>

Sutton, S. (1996) Future service models and the convergence of functions: The reference librarian as technician, author and consultant. In K. Low (Ed.), *The roles of reference librarians: Today and tomorrow* (125-143). New York: Haworth Press.

Tennant, R. (1966) Librarians share their resources--digitized holdings on the net. *Syllabus,* May, pp. 37-38.

U.S.A. Today Poll (1997) April 3.

Young, P. R. (1995) Post-modernism and the academic library. *The Bulletin of the New York Library Association.* Nov., pp. 1, 8,-10, 13.